

USMC H-1 UPGRADES



Navy ACAT ID Program

Total Number of Systems:	280
Total Program Cost (TY\$):	\$9652M
Average Unit Cost (TY\$):	\$10.9M
Full-rate production:	2QFY04

Prime Contractor

Bell Helicopter Textron

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

This program combines upgrades of two USMC H-1 aircraft: the AH-1W Cobra attack helicopter and the UH-1N light utility helicopter. The common elements of the two will be identical twin engines, drive trains, a new four-bladed rotor, tail sections, and integrated digital cockpits. In addition, the AH-1 attack helicopter will gain an upgraded targeting system and the UH-1 will have an upgraded night navigation system. The upgrade will extend the life of the two H-1 models well into the 21st century. The AH-1 will contribute to *precision engagement* and *full-dimensional protection*; the UH-1 will provide support for *focused logistics*.

The upgrade of the AH-1W is referred to as the AH-1Z, and the upgrade of the UH-1N is referred to as the UH-1Y. Collectively, the AH-1Z/UH-1Y effort constitutes the USMC H-1 Upgrades Program.

BACKGROUND INFORMATION

The Marine Corps instituted the H-1 Upgrade program in 1996 by combining several lesser planned upgrades to their UH-1 utility and AH-1 attack helicopters. Prior to entry into EMD in September 1996, DOT&E approved the program's alternative LFT&E plan and USD(A&T) approved a waiver from full-up, system-level LFT&E. The AH-1Z will be tested full-up, system-level; the UH-1Y received a waiver from full-up, system-level testing. The H-1 Upgrades Operational Requirements Documents require that both helicopters be tolerant to impacts by 12.7mm rounds and have crashworthy enhancements. Additionally, the drive components of the AH-1Z should be damage-tolerant to 23mm rounds.

Prior to entry into EMD in September 1996, DOT&E approved the H-1 program's LFT&E program plan. This plan requires the AH-1Z to undergo full-up, system-level Live Fire testing. The UH-1Y received a waiver certification from full-up, system-level Live Fire testing and will be tested and evaluated in accordance with its approved alternative LFT&E plan. The alternative LFT&E alternative plan calls for component- and subsystem-level testing of critical components for each helicopter. Common components tested as part of the AH-1Z Live Fire tests will not be retested as part of the UH-1Y Live Fire testing.

TEST & EVALUATION ACTIVITY

The only OT&E activity during the year was test planning. The approved TEMP calls for the T&E program to be conducted in two phases: integrated contractor/government developmental testing called IT; and Operational Testing. Each aircraft model (AH-1Z and UH-1Y) will undergo its own individual OT and LFT test.

To provide feedback early in development, the operational testers have formed a team to monitor IT and to provide Marine maintainers to assist with aircraft maintenance and to validate maintenance documents and procedures. Concurrent with IT, the operational testers will conduct two operational assessments that will provide data to support two LRIP decisions. OT for both aircraft will be conducted prior to MS III. LFT&E of components and full-scale test articles is being conducted during the course of EMD to complement IT and OT.

Live Fire testing of critical components and subsystems continued, with five of the 17 scheduled tests now completed. During this past year, ballistic firings were conducted against the main rotor drive shaft and the 42° gearbox that drives the tail rotor. FY01 tests will include dynamic ballistic tests of the 90° gearbox located directly next to the tail rotor.

An LFT&E Integrated Product Team (IPT), which includes representatives from DOT&E, the program management activity, the Navy's Air Systems Command, and the prime contractor, has been formally established under the Test Integration Working Group. This group has implemented changes in the component test procedure to ensure that an adequate "get-home" capability is demonstrated following hits to critical components, and is identifying opportunities for a battle damage repair team to participate in the component-level tests as well as the full-up and full-up, system-level Live Fire testing. Priority will be given to those tests against H-1 components which have been redesigned (and thus require a new repair technique to be demonstrated) or lack an repair procedure. Utilization of the component tests to develop or revise repair techniques will allow an opportunity for these new techniques to be

demonstrated during the full-up Live Fire tests of the UH-1Y and the full-up, system-level Live Fire tests of the AH-1Z.

TEST & EVALUATION ASSESSMENT

An Integrated Test Team (ITT) consisting of government and contractor flight test engineers and pilots will conduct the IT phase. The contractor will demonstrate safety of flight of the EMD aircraft prior to participation of government personnel in flight testing. Funding constraints continue to threaten the overall scope of testing; recent program upheaval caused by increased costs and poor performance by the avionics integration subcontractor triggered an ongoing review of the program baseline, the outcome of which is not clear at this writing. The program Test Integration Working Group, in which DOT&E participates, is actively seeking to develop an integrated T&E program that should resolve all critical technical and operational issues before production.

The H-1 Upgrade Program has a comprehensive, robust LFT&E plan which starts with component- and subsystem-level tests and culminates with full-up, system-level testing of an operating AH-1Z configured for combat. In a similar fashion, Live Fire testing of the full-up UH-1 test article will address all but the tail structure and drive train, which are common to both aircraft and will be tested on the AH-1Z. The Live Fire testing will explore various potential kill mechanisms and identify potential design flaws caused by hits from expected threats. The LFT&E program is fully integrated into the systems engineering effort and should yield a reasonable opportunity to incorporate improvements if deficiencies are identified.

